CLAIMS

What is claimed is:

5   1.   A method for processing image data, comprising the steps of:

acquiring a set of image data representative of a region of interest;

acquiring a set of motion data for two or more organs from at least one of one or more types of electrical sensors and one or more types of non-electrical sensors, wherein the set of image data is acquired substantially concurrent with the set of motion data;

10   processing the set of motion data to extract two or more retrospective gating points; and

processing a portion of the set of image data based upon the two or more retrospective gating points.

15   2.   A method for processing image data, comprising the steps of:

acquiring a set of image data representative of a region of interest;

acquiring a set of motion data for two or more organs from at least one of one or more types of electrical sensors and one or more types of non-electrical sensors, wherein the set of image data is acquired substantially concurrent with the set of motion data;

20   processing the set of motion data to extract two or more retrospective gating points;

reconstructing the set of image data to generate a set of reconstructed data; and

processing a portion of the set of reconstructed data based upon the two or more retrospective gating points.

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3.   A computer program, provided on one or more computer readable media, for processing image data, comprising:

a routine for acquiring a set of image data representative of a region of interest;

a routine for acquiring a set of motion data for two or more organs from at least

30   one of one or more types of electrical sensors and one or more types of non-electrical

sensors, wherein the set of image data is acquired substantially concurrent with the set of motion data;

a routine for processing the set of motion data to extract two or more retrospective gating points; and

5   a routine for processing a portion of the set of image data based upon the two or more retrospective gating points.

4.   A computer program, provided on one or more computer readable media, for processing image data, comprising:

10   a routine for acquiring a set of image data representative of a region of interest;

a routine for acquiring a set of motion data for two or more organs from at least one of one or more types of electrical sensors and one or more types of non-electrical sensors, wherein the set of image data is acquired substantially concurrent with the set of motion data;

15   a routine for processing the set of motion data to extract two or more retrospective gating points;

a routine for reconstructing the set of image data to generate a set of reconstructed data; and

a routine for processing a portion of the set of reconstructed data based upon the

20   two or more retrospective gating points.

5.   An imaging system, comprising:

means for acquiring a set of image data representative of a region of interest;

means for acquiring a set of motion data for two or more organs from at least

25   one of one or more types of electrical sensors and one or more types of non-electrical sensors, wherein the set of image data is acquired substantially concurrent with the set of motion data;

means for processing the set of motion data to extract two or more retrospective gating points; and

30   means for processing a portion of the set of image data based upon the two or more retrospective gating points.

6.   An imaging system, comprising:

means for acquiring a set of image data representative of a region of interest;

means for acquiring a set of motion data for two or more organs from at least
5   one of one or more types of electrical sensors and one or more types of non-electrical
sensors, wherein the set of image data is acquired substantially concurrent with the set of
motion data;

means for processing the set of motion data to extract two or more retrospective
gating points;

10   means for reconstructing the set of image data to generate a set of reconstructed
data; and

means for processing a portion of the set of reconstructed data based upon the
two or more retrospective gating points.

15   7.   An imaging system comprising,

an imager configured to generate a plurality of signals representative of a region
of interest;

data acquisition circuitry configured to acquire the plurality of signals;

data processing circuitry configured to receive the plurality of signals, to process
20   a set of motion data to derive two or more retrospective gating points, and to process a
portion of the plurality of signals based upon the two or more retrospective gating
signals;

system control circuitry configured to operate at least one of the imager and the
data acquisition circuitry;

25   an operator workstation configured to communicate with the system control
circuitry and to receive at least the processed portion of the plurality of signals from the
data processing circuitry; and

a sensor-based motion measurement system configured to measure electrical or
non-electrical activity indicative of the motion of two or more organs during imaging to
30   contribute to the set of motion data.

8.   An imaging system comprising,

an imager configured to generate a plurality of signals representative of a region of interest;

data acquisition circuitry configured to acquire the plurality of signals;

5   data processing circuitry configured to receive the plurality of signals, to process a set of motion data to derive two or more retrospective gating points, to reconstruct the plurality of signals to generate a set of reconstructed data, and to process a portion of the reconstructed data based upon the two or more retrospective gating signals;

system control circuitry configured to operate at least one of the imager and the

10   data acquisition circuitry;

an operator workstation configured to communicate with the system control circuitry and to receive at least the processed portion of the reconstructed data from the data processing circuitry; and

a sensor-based motion measurement system configured to measure electrical or

15   non-electrical activity indicative of the motion of two or more organs during imaging to contribute to the set of motion data.

9.   A method for processing image data, comprising the steps of:

acquiring a set of image data representative of a region of interest;

20   acquiring a set of motion data for a respiratory organ from one of one or more types of electrical sensors and one or more types of non-electrical sensors, wherein the set of image data is acquired substantially concurrent with the set of motion data;

processing the set of motion data to extract two or more retrospective gating points; and

25   processing a portion of the set of image data based upon the two or more retrospective gating points.

10.   A method for processing image data, comprising the steps of:

acquiring a set of image data representative of a region of interest;

acquiring a set of motion data for a respiratory organ from one or more types of electrical sensors and one or more types of non-electrical sensors, wherein the set of image data is acquired substantially concurrent with the set of motion data;

processing the set of motion data to extract two or more retrospective gating points;

reconstructing the set of image data to generate a set of reconstructed data; and

processing a portion of the set of reconstructed data based upon the two or more retrospective gating points.

11.   A computer program, provided on one or more computer readable media, for processing image data, comprising:

a routine for acquiring a set of image data representative of a region of interest;

a routine for acquiring a set of motion data for a respiratory organ from one or more types of electrical sensors and one or more types of non-electrical sensors, wherein the set of image data is acquired substantially concurrent with the set of motion data;

a routine for processing the set of motion data to extract two or more retrospective gating points; and

a routine for processing a portion of the set of image data based upon the two or more retrospective gating points.

12.   A computer program, provided on one or more computer readable media, for processing image data, comprising:

a routine for acquiring a set of image data representative of a region of interest;

a routine for acquiring a set of motion data for a respiratory organ from one or more types of electrical sensors and one or more types of non-electrical sensors, wherein the set of image data is acquired substantially concurrent with the set of motion data;

a routine for processing the set of motion data to extract two or more retrospective gating points;

a routine for reconstructing the set of image data to generate a set of reconstructed data; and

a routine for processing a portion of the set of reconstructed data based upon the two or more retrospective gating points.

13. An imaging system, comprising:

means for acquiring a set of image data representative of a region of interest;

means for acquiring a set of motion data for a respiratory organ from one or more types of electrical sensors and one or more types of non-electrical sensors, wherein the set of image data is acquired substantially concurrent with the set of motion data;

means for processing the set of motion data to extract two or more retrospective gating points; and

means for processing a portion of the set of image data based upon the two or more retrospective gating points.

14. An imaging system, comprising:

means for acquiring a set of image data representative of a region of interest;

means for acquiring a set of motion data for a respiratory organ from one or more types of electrical sensors and one or more types of non-electrical sensors, wherein the set of image data is acquired substantially concurrent with the set of motion data;

means for processing the set of motion data to extract two or more retrospective gating points;

means for reconstructing the set of image data to generate a set of reconstructed data; and

means for processing a portion of the set of reconstructed data based upon the two or more retrospective gating points.

15. An imaging system comprising,

an imager configured to generate a plurality of signals representative of a region of interest;

data acquisition circuitry configured to acquire the plurality of signals;

data processing circuitry configured to receive the plurality of signals, to process a set of motion data to derive two or more retrospective gating points, and to process a

portion of the plurality of signals based upon the two or more retrospective gating signals;

system control circuitry configured to operate at least one of the imager and the data acquisition circuitry;

5 an operator workstation configured to communicate with the system control circuitry and to receive at least the processed portion of the plurality of signals from the data processing circuitry;

a sensor-based motion measurement system configured to measure electrical activity indicative of the motion of a respiratory organ during imaging to contribute to

10 the set of motion data; and

a sensor-based motion measurement system configured to measure non-electrical activity indicative of the motion of a respiratory organ during imaging to contribute to the set of motion data.

15 16. An imaging system comprising,

an imager configured to generate a plurality of signals representative of a region of interest;

data acquisition circuitry configured to acquire the plurality of signals;

data processing circuitry configured to receive the plurality of signals, to process

20 a set of motion data to derive two or more retrospective gating points, to reconstruct the plurality of signals to generate a set of reconstructed data, and to process a portion of the reconstructed data based upon the two or more retrospective gating signals;

system control circuitry configured to operate at least one of the imager and the data acquisition circuitry;

25 an operator workstation configured to communicate with the system control circuitry and to receive at least the processed portion of the reconstructed data from the data processing circuitry; and

a sensor-based motion measurement system configured to measure electrical activity indicative of the motion of a respiratory organ during imaging to contribute to

30 the set of motion data; and

a sensor-based motion measurement system configured to measure non-electrical activity indicative of the motion of a respiratory organ during imaging to contribute to the set of motion data.

5   17.   A method for processing image data, comprising the steps of:

acquiring a set of image data representative of a region of interest;

acquiring a set of motion data comprising cardiac motion data acquired by one or more types of non-electrical sensors and respiratory motion data acquired by at least one of one or more types of electrical sensors and one or more types of non-electrical

10   sensors, wherein the set of image data is acquired substantially concurrent with the set of motion data;

processing the sets of motion data to extract two or more retrospective gating points; and

processing a portion of the set of image data based upon the two or more

15   retrospective gating points.

18.   A method for processing image data, comprising the steps of:

acquiring a set of image data representative of a region of interest;

acquiring a set of motion data comprising cardiac motion data acquired by one or

20   more types of non-electrical sensors and respiratory motion data acquired by at least one of one or more types of electrical sensors and one or more types of non-electrical sensors, wherein the set of image data is acquired substantially concurrent with the set of motion data;

processing the set of motion data to extract two or more retrospective gating

25   points;

reconstructing the set of image data to generate a set of reconstructed data; and

processing a portion of the set of reconstructed data based upon the two or more retrospective gating points.

30   19.   A computer program, provided on one or more computer readable media, for processing image data, comprising:

a routine for acquiring a set of image data representative of a region of interest;

a routine for acquiring a set of motion data comprising cardiac motion data acquired by one or more types of non-electrical sensors and respiratory motion data acquired by at least one of one or more types of electrical sensors and one or more types of non-electrical sensors, wherein the set of image data is acquired substantially concurrent with the set of motion data;

a routine for processing the sets of motion data to extract two or more retrospective gating points; and

a routine for processing a portion of the set of image data based upon the two or more retrospective gating points.

20.   A computer program, provided on one or more computer readable media, for processing image data, comprising:

a routine for acquiring a set of image data representative of a region of interest;

a routine for acquiring a set of motion data comprising cardiac motion data acquired by one or more types of non-electrical sensors and respiratory motion data acquired by at least one of one or more types of electrical sensors and one or more types of non-electrical sensors, wherein the set of image data is acquired substantially concurrent with the set of motion data;

a routine for processing the set of motion data to extract two or more retrospective gating points;

a routine for reconstructing the set of image data to generate a set of reconstructed data; and

a routine for processing a portion of the set of reconstructed data based upon the two or more retrospective gating points.

21.   An imaging system, comprising:

means for acquiring a set of image data representative of a region of interest;

means for acquiring a set of motion data comprising cardiac motion data acquired by one or more types of non-electrical sensors and respiratory motion data acquired by at least one of one or more types of electrical sensors and one or more types

of non-electrical sensors, wherein the set of image data is acquired substantially concurrent with the set of motion data;

means for processing the sets of motion data to extract two or more retrospective gating points; and

5   means for processing a portion of the set of image data based upon the two or more retrospective gating points.

22.   An imaging system, comprising:

means for acquiring a set of image data representative of a region of interest;

10   means for acquiring a set of motion data comprising cardiac motion data acquired by one or more types of non-electrical sensors and respiratory motion data acquired by at least one of one or more types of electrical sensors and one or more types of non-electrical sensors, wherein the set of image data is acquired substantially concurrent with the set of motion data;

15   means for processing the set of motion data to extract two or more retrospective gating points;

means for reconstructing the set of image data to generate a set of reconstructed data; and

means for processing a portion of the set of reconstructed data based upon the

20   two or more retrospective gating points.

23.   An imaging system comprising,

an imager configured to generate a plurality of signals representative of a region of interest;

25   data acquisition circuitry configured to acquire the plurality of signals;

data processing circuitry configured to receive the plurality of signals, to process a set of motion data to derive two or more retrospective gating points, and to process a portion of the plurality of signals based upon the two or more retrospective gating signals;

30   system control circuitry configured to operate at least one of the imager and the data acquisition circuitry;

an operator workstation configured to communicate with the system control circuitry and to receive at least the processed portion of the plurality of signals from the data processing circuitry;

a sensor-based motion measurement system configured to measure non-electrical activity indicative of the motion of a heart during imaging to contribute to the set of motion data; and

at least one sensor-based motion measurement system configured to measure electrical or non-electrical activity indicative of the motion of a respiratory organ during imaging to contribute to the set of motion data.

24.   An imaging system comprising,

an imager configured to generate a plurality of signals representative of a region of interest;

data acquisition circuitry configured to acquire the plurality of signals;

data processing circuitry configured to receive the plurality of signals, to process a set of motion data to derive two or more retrospective gating points, to reconstruct the plurality of signals to generate a set of reconstructed data, and to process a portion of the reconstructed data based upon the two or more retrospective gating signals;

system control circuitry configured to operate at least one of the imager and the data acquisition circuitry;

an operator workstation configured to communicate with the system control circuitry and to receive at least the processed portion of the reconstructed data from the data processing circuitry; and

a sensor-based motion measurement system configured to measure non-electrical activity indicative of the motion of a heart during imaging to contribute to the set of motion data; and

at least one sensor-based motion measurement system configured to measure electrical or non-electrical activity indicative of the motion of a respiratory organ during imaging to contribute to the set of motion data.

25.   A method for processing image data, comprising the steps of:

acquiring a set of image data representative of a region of interest from an imager of one of a MRI system, a PET system, a nuclear imaging system, an X-ray system, a PET-CT system, and an ultrasound system;

acquiring a set of motion data for a heart from one or more types of electrical sensors and one or more types of non-electrical sensors, wherein the set of image data is acquired substantially concurrent with the set of motion data;

processing the sets of motion data to extract two or more retrospective gating points; and

processing a portion of the set of image data based upon the two or more retrospective gating points.

26. A method for processing image data, comprising the steps of:

acquiring a set of image data representative of a region of interest from an imager of one of a MRI system, a PET system, a nuclear imaging system, an X-ray system, a PET-CT system, and an ultrasound system;

acquiring a set of motion data for a heart from one or more types of electrical sensors and one or more types of non-electrical sensors, wherein the set of image data is acquired substantially concurrent with the set of motion data;

processing the set of motion data to extract two or more retrospective gating points;

reconstructing the set of image data to generate a set of reconstructed data; and

processing a portion of the set of reconstructed data based upon the two or more retrospective gating points.

27. A computer program, provided on one or more computer readable media, for processing image data, comprising:

a routine for acquiring a set of image data representative of a region of interest from an imager of one of a MRI system, a PET system, a nuclear imaging system, an X-ray system, a PET-CT system, and an ultrasound system;

a routine for acquiring a set of motion data for a heart from one or more types of electrical sensors and one or more types of non-electrical sensors, wherein the set of image data is acquired substantially concurrent with the set of motion data;

a routine for processing the sets of motion data to extract two or more retrospective gating points; and

a routine for processing a portion of the set of image data based upon the two or more retrospective gating points.

28.   A computer program, provided on one or more computer readable media, for processing image data, comprising:

a routine for acquiring a set of image data representative of a region of interest from an imager of one of a MRI system, a PET system, a nuclear imaging system, an X-ray system, a PET-CT system, and an ultrasound system;

a routine for acquiring a set of motion data for a heart from one or more types of electrical sensors and one or more types of non-electrical sensors, wherein the set of image data is acquired substantially concurrent with the set of motion data;

a routine for processing the set of motion data to extract two or more retrospective gating points;

a routine for reconstructing the set of image data to generate a set of reconstructed data; and

a routine for processing a portion of the set of reconstructed data based upon the two or more retrospective gating points.

29.   An imaging system, comprising:

means for acquiring a set of image data representative of a region of interest from an imager of one of a MRI system, a PET system, a nuclear imaging system, an X-ray system, a PET-CT system, and an ultrasound system;

means for acquiring a set of motion data for a heart from one or more types of electrical sensors and one or more types of non-electrical sensors, wherein the set of image data is acquired substantially concurrent with the set of motion data;

means for processing the sets of motion data to extract two or more retrospective gating points; and

means for processing a portion of the set of image data based upon the two or more retrospective gating points.

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30. An imaging system, comprising:

means for acquiring a set of image data representative of a region of interest from an imager of one of a MRI system, a PET system, a nuclear imaging system, an X-ray system, a PET-CT system, and an ultrasound system;

10 means for acquiring a set of motion data for a heart from one or more types of electrical sensors and one or more types of non-electrical sensors, wherein the set of image data is acquired substantially concurrent with the set of motion data;

means for processing the set of motion data to extract two or more retrospective gating points;

15 means for reconstructing the set of image data to generate a set of reconstructed data; and

means for processing a portion of the set of reconstructed data based upon the two or more retrospective gating points.

20 31. An imaging system comprising,

an imager configured to generate a plurality of signals representative of a region of interest, wherein the imager comprises one of a MRI imager, a PET imager, a nuclear imager, an X-ray imager, a PET-CT imager, and an ultrasound imager;

data acquisition circuitry configured to acquire the plurality of signals;

25 data processing circuitry configured to receive the plurality of signals, to process a set of motion data to derive two or more retrospective gating points, and to process a portion of the plurality of signals based upon the two or more retrospective gating signals;

system control circuitry configured to operate at least one of the imager and the

30 data acquisition circuitry;

an operator workstation configured to communicate with the system control circuitry and to receive at least the processed portion of the plurality of signals from the data processing circuitry;

at least one sensor-based motion measurement system configured to measure non-electrical activity indicative of the motion of a heart during imaging to contribute to the set of motion data; and

at least one sensor-based motion measurement system configured to measure electrical activity indicative of the motion of the heart during imaging to contribute to the set of motion data.

32.   An imaging system comprising,

an imager configured to generate a plurality of signals representative of a region of interest, wherein the imager comprises one of a MRI imager, a PET imager, a nuclear imager, an X-ray imager, a PET-CT imager, and an ultrasound imager;

data acquisition circuitry configured to acquire the plurality of signals;

data processing circuitry configured to receive the plurality of signals, to process a set of motion data to derive two or more retrospective gating points, to reconstruct the plurality of signals to generate a set of reconstructed data, and to process a portion of the reconstructed data based upon the two or more retrospective gating signals;

system control circuitry configured to operate at least one of the imager and the data acquisition circuitry;

an operator workstation configured to communicate with the system control circuitry and to receive at least the processed portion of the reconstructed data from the data processing circuitry;

at least one sensor-based motion measurement system configured to measure non-electrical activity indicative of the motion of a heart during imaging to contribute to the set of motion data; and

at least one sensor-based motion measurement system configured to measure electrical activity indicative of the motion of the heart during imaging to contribute to the set of motion data.